



A  Sempra Energy utility®

Climate Adaptation:

Anticipate, Prepare, React and Recover

EPIC Symposium
December 1, 2016



Climate Adaptation – *On-Going Initiatives*



CEC Grant Funding

Opportunities: To identify electricity and natural gas adaptation options based on assessment of climate-related hazard vulnerability.



DOE Partnership for Energy Sector Climate Resilience:

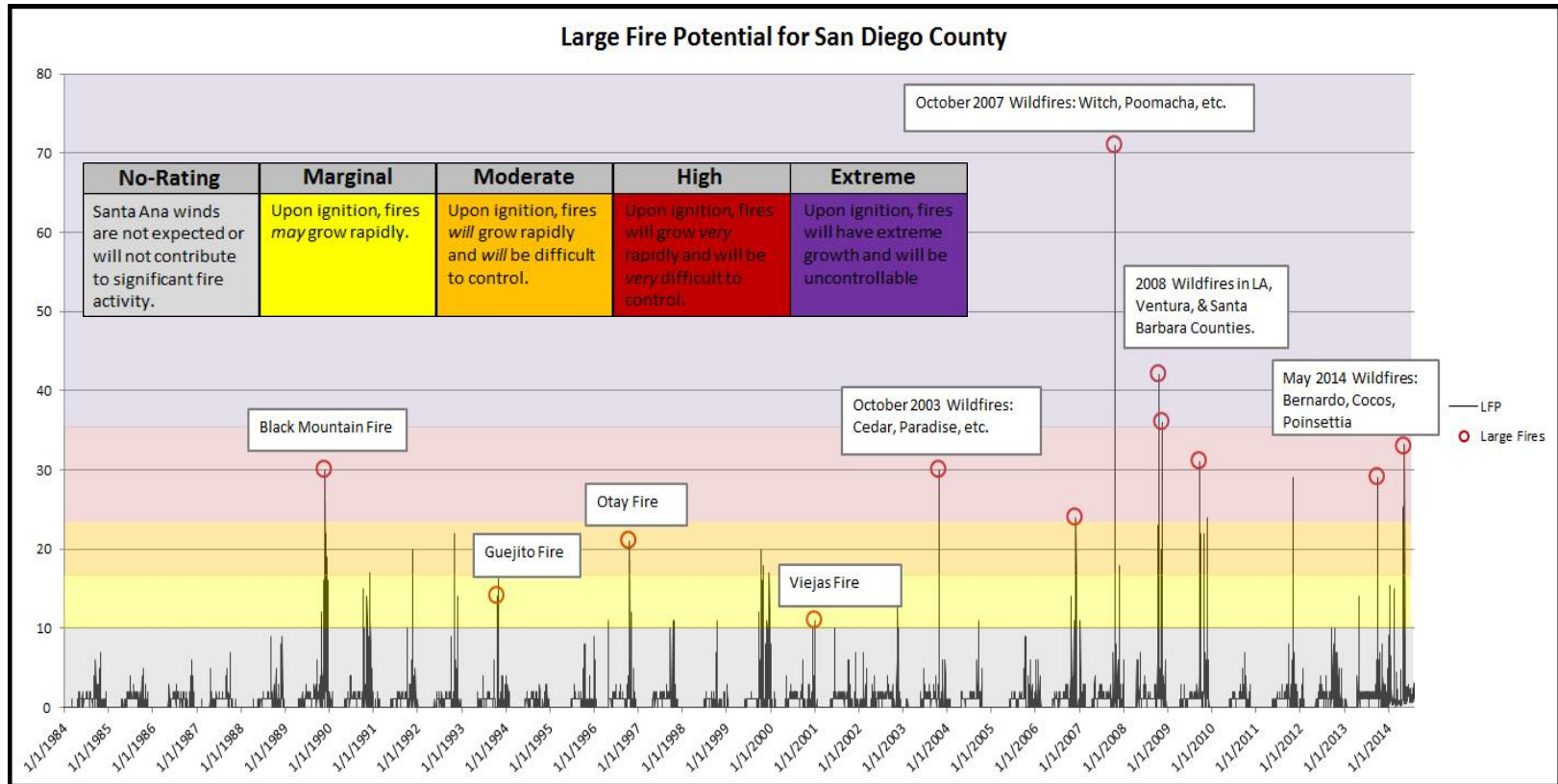
SDG&E collaborates with the DOE and 18 other utilities to improve the resilience of the nation's energy infrastructure against extreme weather and climate change impacts.

SDG&E Climate Advisory Group:

15 SDG&E departments are represented, providing climate adaption guidance and gaining a better understanding of the risk.

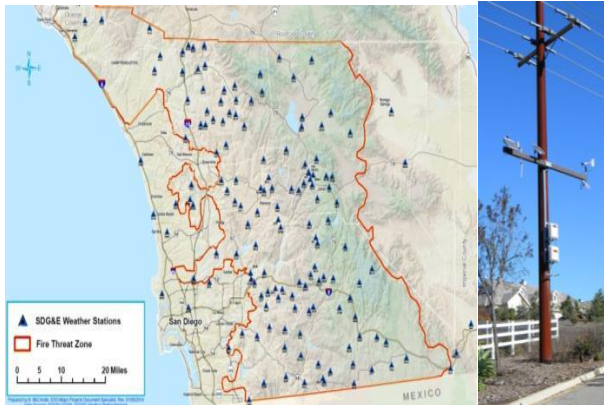
ADVISORY GROUP PARTICIPANTS
Meteorology
Environmental Strategy
Emergency Services
Regulatory & Legislative Affairs
Litigation
Gov't Affairs
Operations Risk Management
Media Relations
Electric Distribution Operations
Gas Operations
Commercial & Industrial Services
Grid Operations
Elect Trans & Dist Engineering
Construction
Electric System Planning

Climate Adaptation - *Tracking the Climate*

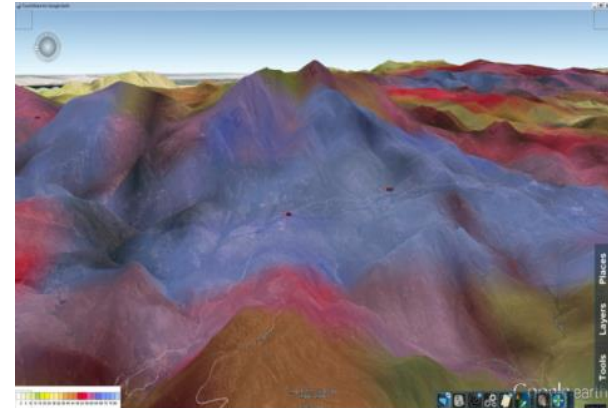


Defining Resilience/Adaption: A capability to ***anticipate, prepare for, react*** to, and ***recover*** from significant multi-hazard threats with minimum damage to social well-being, the economy, and the environment. [2014 National Climate Assessment](#)

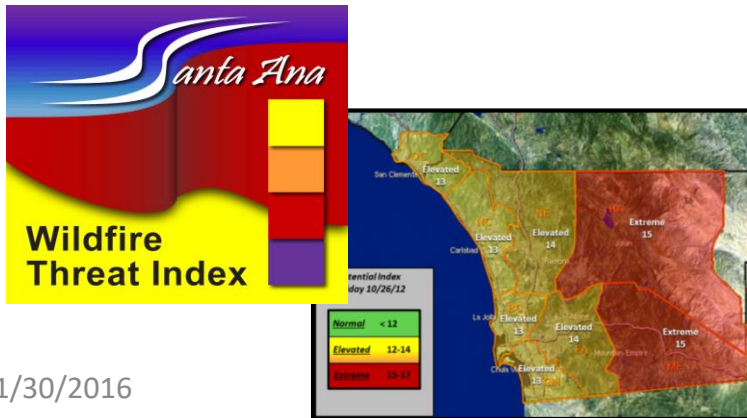
- **SDG&E Weather Station Network –**
Nation's largest utility weather network



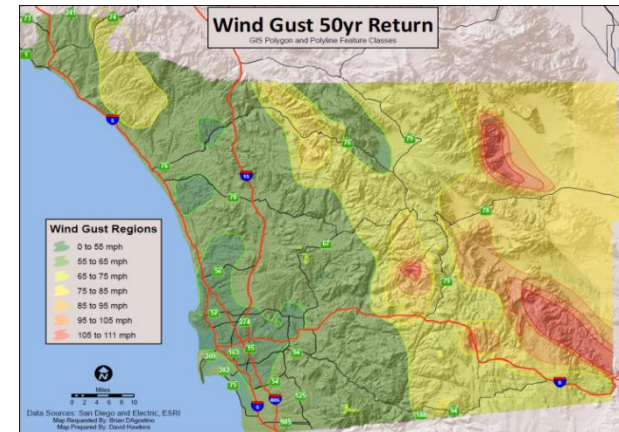
- **State-of-the-Art Forecasting System –**
Built custom forecast system in-house



- **Santa Ana Wildfire Threat Index & Fire Potential Index –**
Built new tools to assess wildfire potential



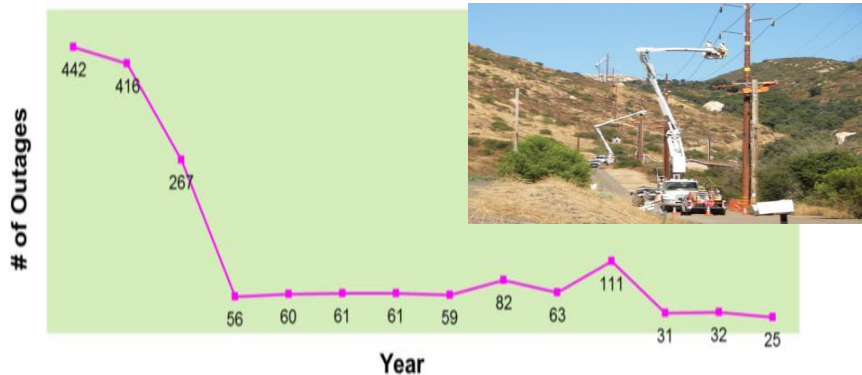
- **50 Year Wind Gust Projections**
Understanding threat potential



- ***Vegetation Management / FiRM –***

Mitigate ignition risk

Historical Tree Outages



- ***Staging Crews in the Field -***

Proactively minimize incident response times



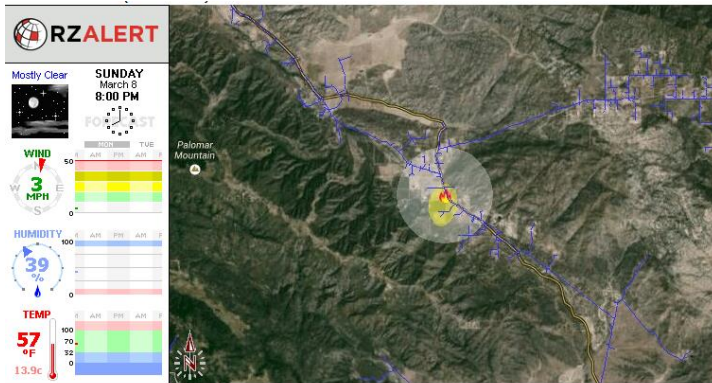
- ***Customer Communications/EOC –*** Proactive initiatives



Climate Adaptation – *React*

- **Safety Shut off –**

Line de-energization when conditions warrant



- **Mobile Command Trailers–**

Enhanced field response/communication



- **Coordinated Response –** Collaborate closely, sharing recourses with wildfire community



Climate Adaption – *Recover*

- **System Hardening –**
Wood to steel, minimizing system damage



- **Next Generation Incident Command System (NICS) –**
Coordinated intel/response



Climate Adaptation – Sea Level Rise Modeling



Max Wave Runup during Flood 050cm SLR + Wave 100



Inner Bay Low Flood 050cm SLR + Wave 100



Flood-prone Low-lying Areas 050cm SLR + Wave 100



Inner Bay Flood Hazard 050cm SLR + Wave 100



Flood Hazard 050cm SLR + Wave 100



Inner Bay Flood Depth 050cm SLR + Wave 100

No Data

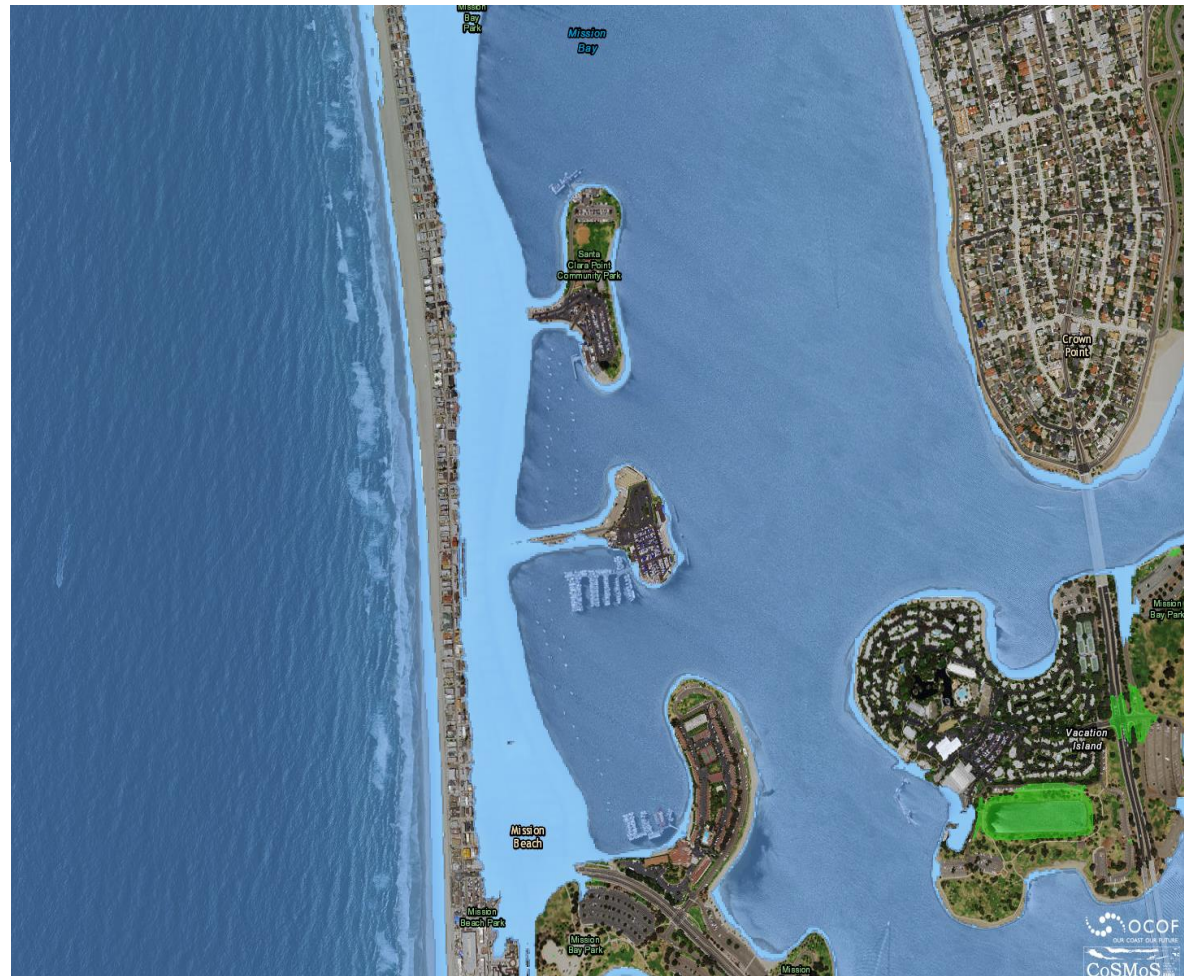
0 cm

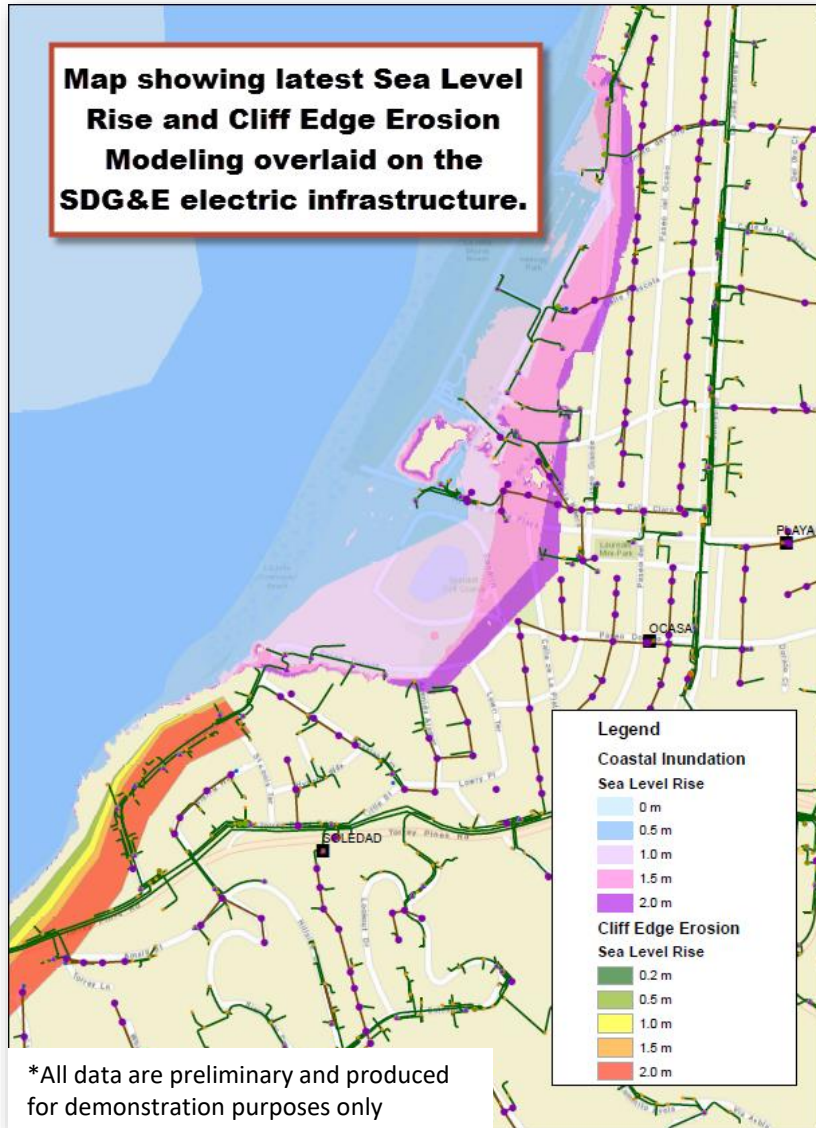
250 cm

500 cm

750 cm

Flood Depth 050cm SLR + Wave 100

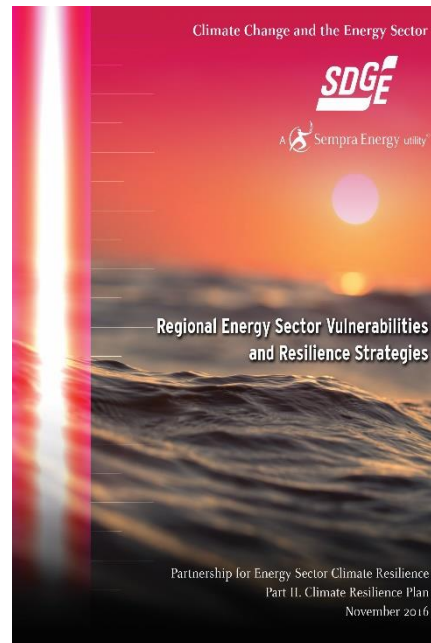




Linear footage of electric assets potentially impacted by sea level rise

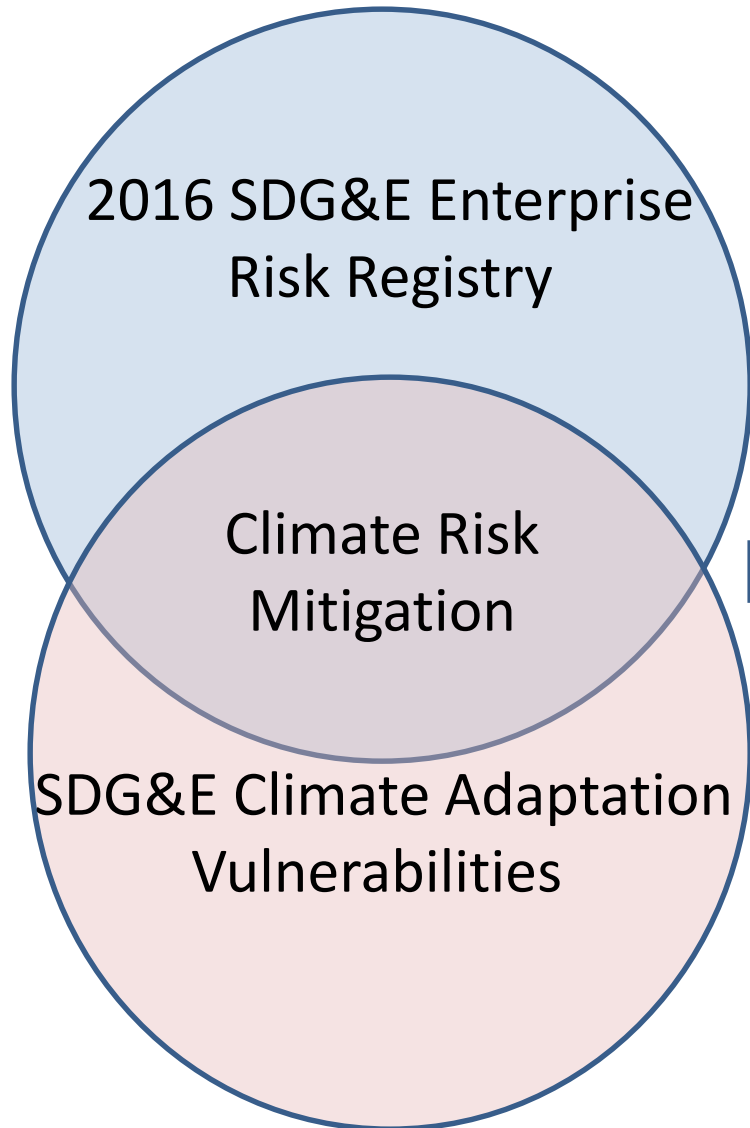
SLR (cm)	Linear Feet of Electric Assets			Percent Impacted
	Duct Bank	Pole Line	Grand Total	
0	647	366	1,013	< 0.01%
50	269,561	112,448	382,009	0.28%
100	556,190	204,511	760,701	0.55%
150	812,193	284,054	1,096,247	0.80%
200	1,206,658	400,165	1,606,823	1.17%

**All data are preliminary and produced for demonstration purposes only.*



- Information from ICF is currently being integrated into climate resiliency documents being developed by SDG&E

SDG&E Climate Risk Mitigation Strategy



Climate Impacted Risks

Wildfires*

Insufficient Natural Gas Supply
High Electric Rates

Electric Infrastructure Integrity*

IT Infrastructure
Insurance Coverage

Climate Change*

Gas Distribution*

Regulatory Decisions
Emergency Spares
Unplanned Generation Plant Outages
Business Resumption Plans

*Risk Assessment Mitigation Phase
(RAMP) Risks

Questions?

